Chapter 4: Refuge and District Management

Current Refuge and District Programs: Where We Are Today

Photograph by Scott Sharkey

Consistent with its authorizing legislation, Minnesota Valley National Wildlife Refuge conducts a wide array of wildlife conservation activities within the Lower Minnesota River Valley and its District. The Master Plan for the Refuge, which was completed in 1984, called for the establishment of grasslands and food plots (corn and soybeans) on Refuge floodplain to enhance the area for waterfowl nesting and migration. Following some unsuccessful attempts to meet these objectives, the Refuge reassessed its habitat restoration and management programs and, with the input of other conservationists, developed its Landscape Plan in 1993. This plan basically set forth the philosophy of restoring Refuge plant communities to native species. It also identified the importance of using natural processes such as prescribed fire and water management to maintain the diversity and productivity of these communities. This philosophy remains today and will be integral within this Comprehensive Conservation Plan. In brief, the Refuge's habitat restoration and management program can be summarized by the phrase "native species and natural processes."

The Refuge's urban setting also offers unique opportunities to interact with diverse and supportive audiences. For example, Refuge staff have the privilege of providing environmental education programs to inner-city schools as well as those located in suburban or rural locations. Likewise, hunting, fishing, and wildlife observation, photography, and interpretive opportunities are provided on Refuge and District lands.

Habitat Restoration

Since its establishment, nearly 12,000 acres have been acquired or placed under management agreement within the Refuge. Initially, some of the former agriculture lands (less than 100 acres) were converted to floodplain grasslands for waterfowl nesting purposes. Introduced species such as Reed's canary grass and others were planted to a variety of native grasses. However, during 1992-93 all cropping ceased on remaining Refuge agricultural fields (less than 200 acres). No deliberate attempts were made to re-establish a preferred plant community on these areas. Consequently, early succession species such as cottonwood, willow, and box elder emerged as well as thistle and ragweed.

In recent years, the Refuge has emphasized the restoration of all lands to native plant communities. For example, bur oak, silver maple, and green ash have been planted to complement natural succession and to increase diversity in the floodplain. Likewise, a diverse mixture of native grasses and forbs have been reestablished on upland sites that historically contained grasslands. Wetland restoration activities have included the

plugging of drainage ditches, the mechanical removal of woody vegetation from wet meadows and fens, and the installation of outlet ditches and water control structures on larger wetlands.

Habitat restoration activities on waterfowl production areas and easements also follow this same philosophy. Native grasses are restored on upland areas and wetlands are restored to historic levels when possible. Due to logistical concerns, water control structures are generally not installed on wetlands located on Waterfowl Production Areas or easement lands.

Habitat Management on the Refuge

The primary objective of the habitat management program at the Refuge is to maintain diverse, productive, and sustainable native plant communities. Through periodic treatments, these lands maintain their value to Refuge wildlife and help meet their production, feeding, and migration requirements.

To assist in the management of these habitats, the Refuge in cooperation with the MnDNR and others has completed cover-type GIS mapping for all units of the Refuge. These units are mapped using the Minnesota Land Cover Classification System, which integrates cultural features such as residences and roads, non-native vegetation, and natural and semi-natural vegetation into a comprehensive system (Figures 4-8).

Deep Water Habitats

Horseshoe Lake on the Rapids Lake Unit is one of two deep water habitats on the Refuge. Historically, this lake was an oxbow of the Minnesota River, but it has since become disconnected from the main channel. The depth of this lake is currently unknown, as is the composition of its fishery. The Refuge shares ownership with private parties on Long Lake, the other deep water habitat on the Rapids Lake Unit. A 1998 fishery survey showed that 18 species of fish occupied the lake, along with many large snapping turtles. The most numerous species were black crappie, gizzard shad, black and brown bullhead, and carp. Aquatic exchange with these lakes and the Minnesota River does occur nearly every year during spring flooding. The open water pools serve as a loafing area for waterfowl, marsh birds, and occasional seasonal habitat for shorebirds. The trees surrounding the lakes provide good perch sites for a number of species including herons, bitterns, and raptors such as the Bald Eagle and Red-tailed Hawk.

Small Streams

Several small streams exist on the Refuge and some of these historically supported native brook trout populations. The origins of the larger streams, such as Sand Creek, are in the watershed above the river valley. Some streams originate from springs within the bluff and bluff/floodplain transition zone of the Minnesota River. To date, no active habitat management has been undertaken on these streams.

Wetlands

The Refuge contains a variety of wetlands including fens, wet meadows, and large riverine marshes. Water control structures and outlet ditches have been installed on several of the riverine marshes. Over the years, three moist soil management units and one green tree reservoir have also been established within the floodplain of the Minnesota River. Most of these wetlands provide good quality production, brood rearing,

Figure 4: Existing Habitat (2002), Long Meadow Lake and Black Dog Units

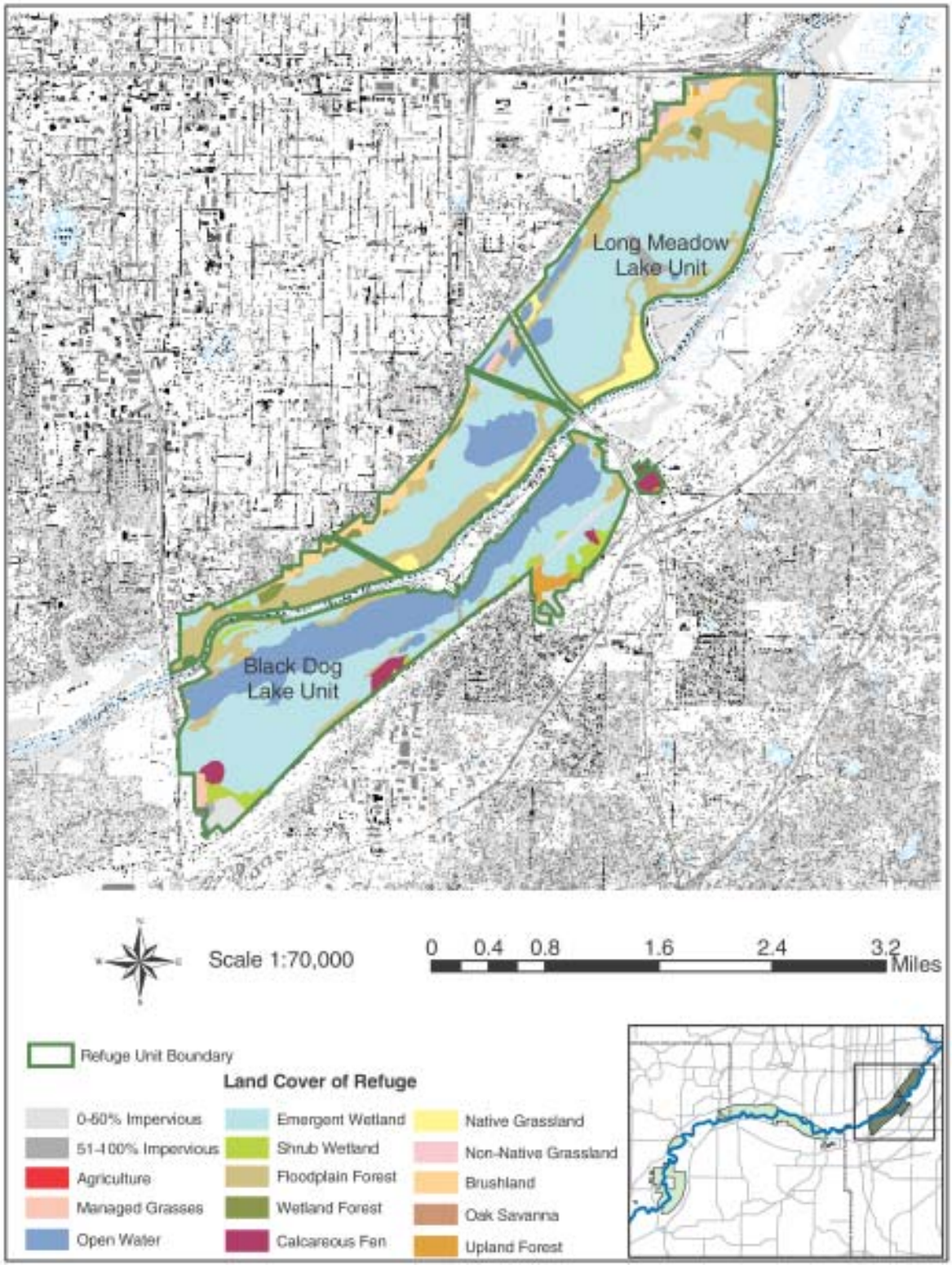


Figure 5: Existing Habitat (2002), Upgrala, Wilkie and Bloomington Ferry Units

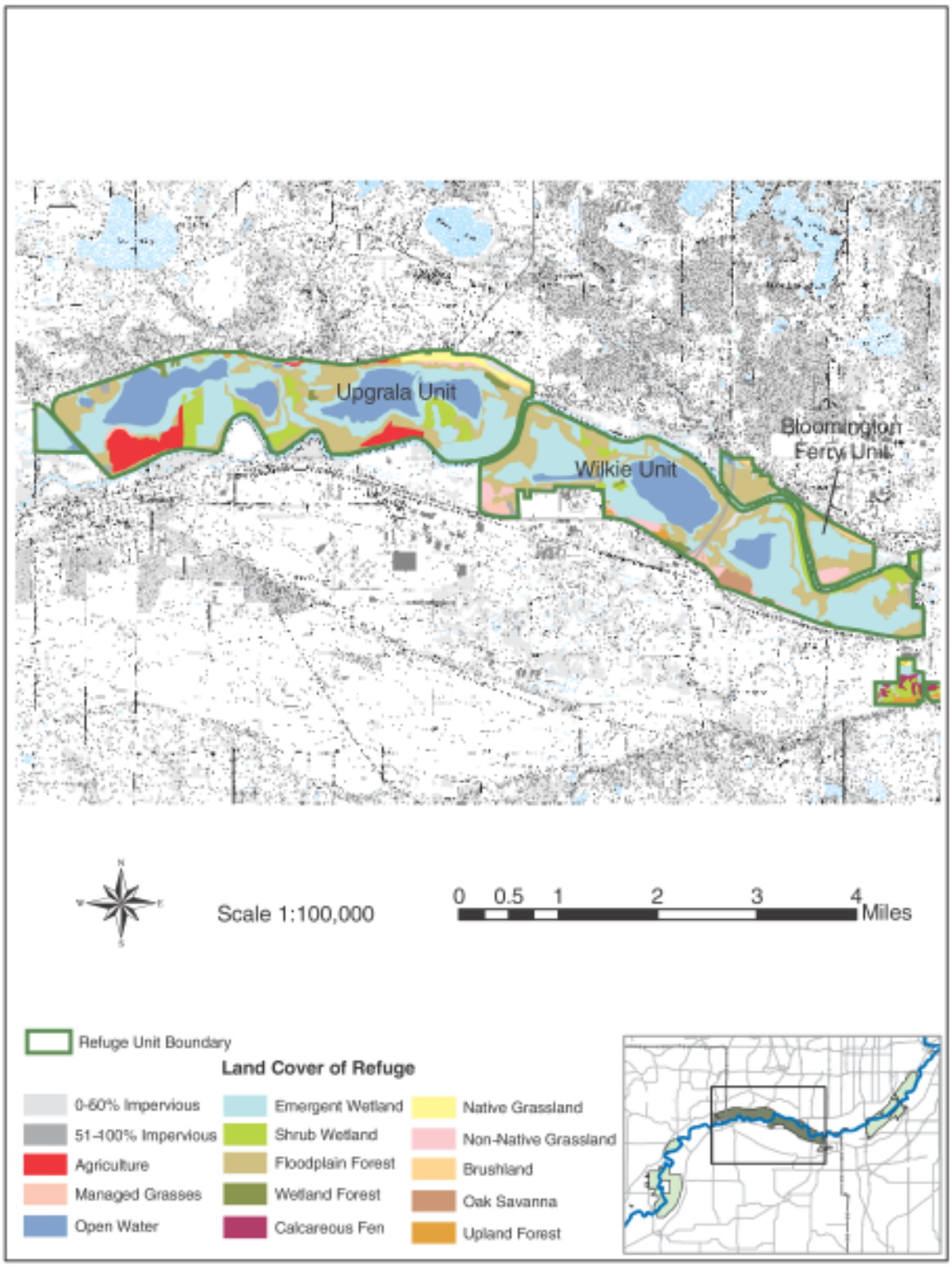


Figure 6: Existing Habitat (2002), Savage Fen Unit

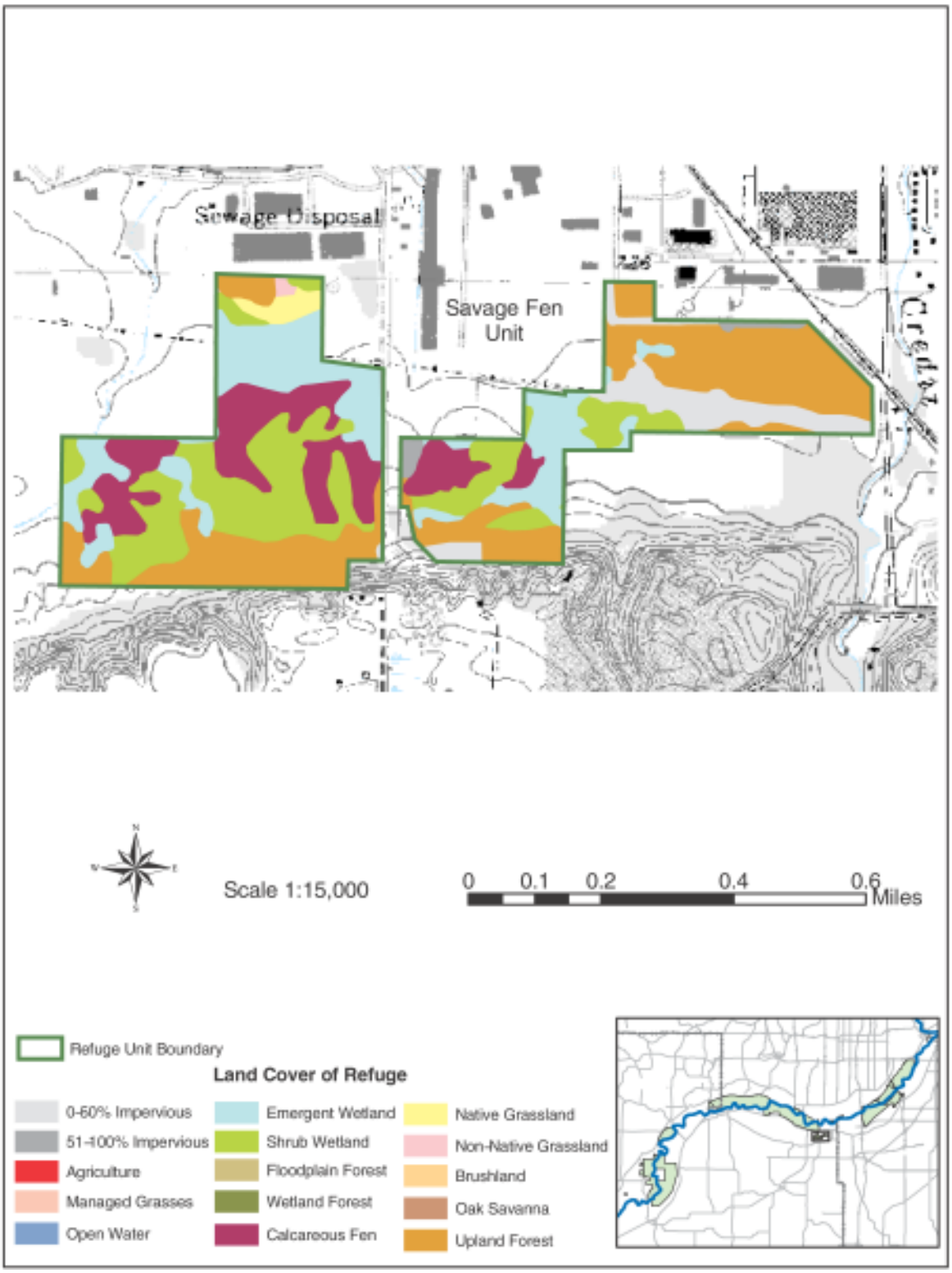


Figure 7: Existing Habitat (2002), Chaska Unit

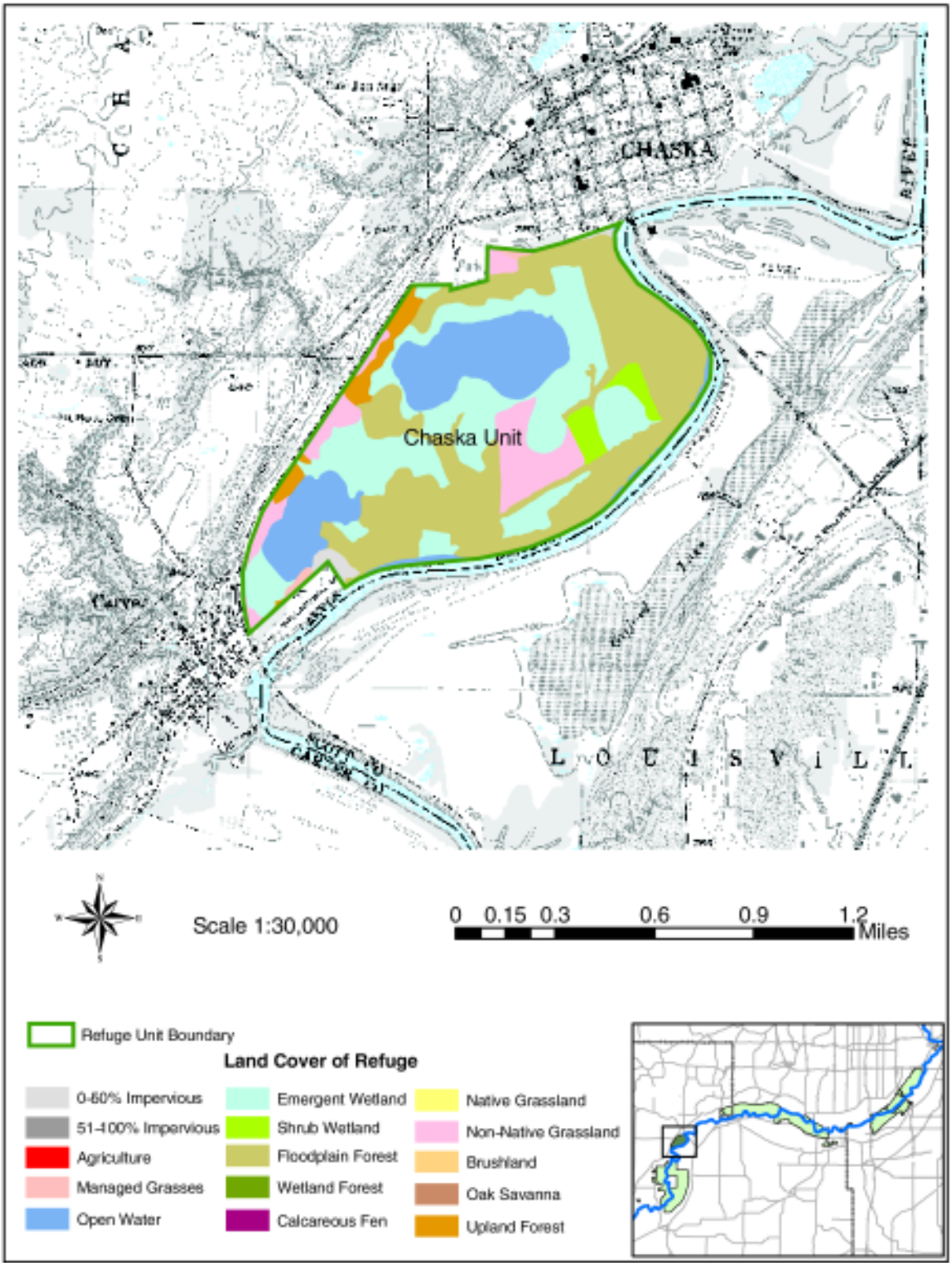
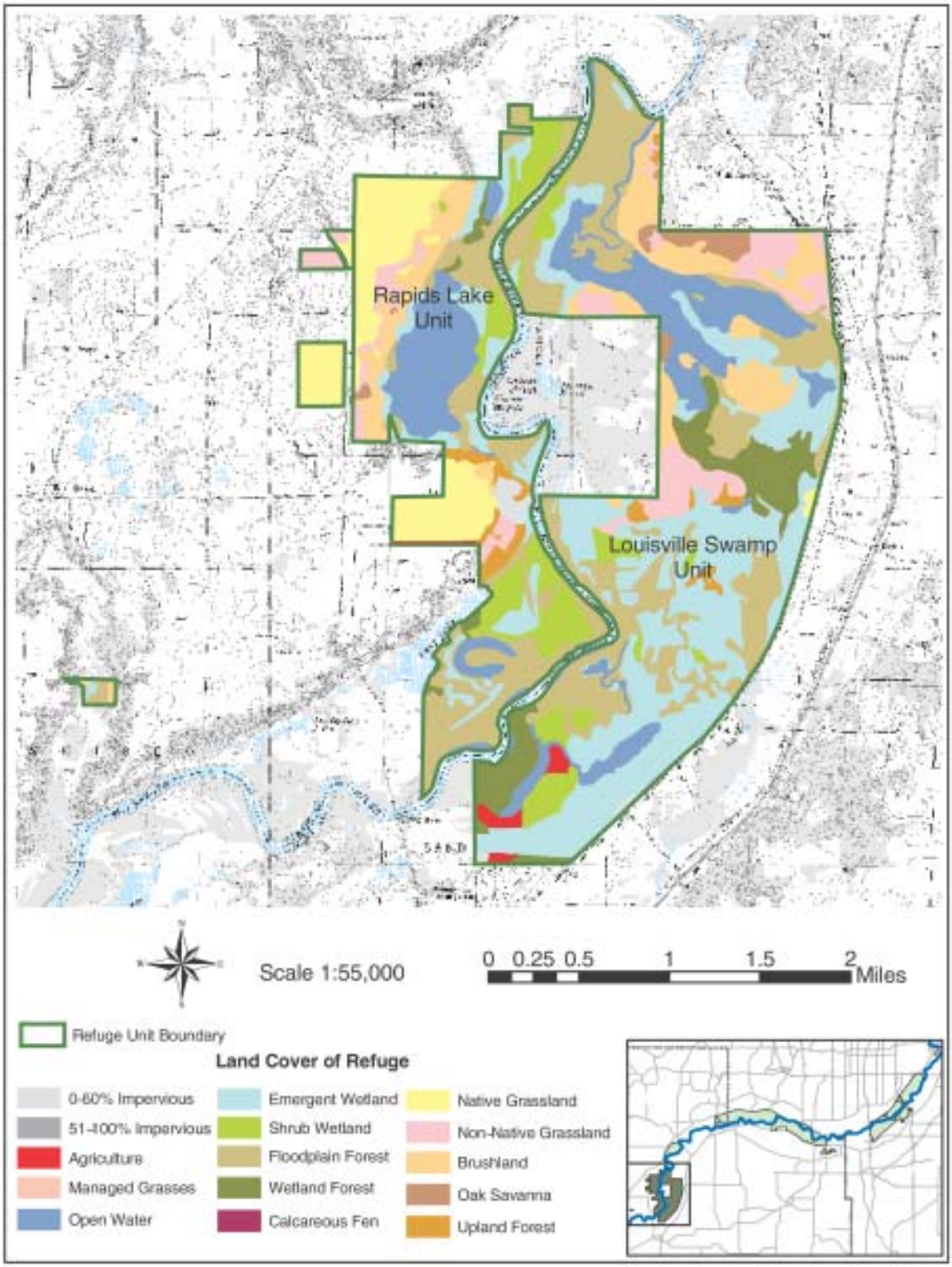


Figure 8: Existing Habitat (2002), Rapids Lake and Louisville Swamp Units



feeding, and/or migration habitats for a host of resident and migratory species. They also provide good quality spawning and nursery habitat for fish that inhabit the Minnesota River.

Photograph by Scott Starkey

Water level management is the primary technique used to maintain the diversity and productivity of Refuge wetlands. Through periodic drawdowns, followed by subsequent reflooding, they support a variety of aquatic emergents and expose mudflats that attract good concentrations of waterfowl, waterbirds, and shorebirds.

Frequent fluctuations of the Minnesota River sometimes complicate the management of these large wetlands. For example, high river elevations during late spring and summer can prevent drawdowns and the germination of emergent vegetation. Likewise, prolonged or frequent flooding can destroy beneficial aquatic plants and convert the area from a "hemi-marsh" community to open water wetland habitats with limited plant diversity. Fortunately, however, the long-term productivity of these wetlands can be maintained with a committed effort that is prepared to take advantage of drawdowns and other management opportunities when they occur. Water control structures designed to keep the low bounces of the Minnesota River out of these wetlands also enhance the success of this management. An active water management program also helps to decrease rough fish populations that exist in many of these riverine wetlands.

As indicated earlier, three moist soil management units have been constructed on the Refuge since its inception. All of these units were constructed as mitigation for a development project that impacted Refuge lands to some degree. Unfortunately, these units have not functioned as planned due to a number of factors, including permeable soils upon which they were constructed. The long-term plan for these units is to convert them to green tree reservoirs as the adjacent floodplains are reestablished to a forest cover.

Management of calcareous and sedge fens that occur on the Refuge consists of periodic prescribed burning with hand removal of invading shrubs. Management is needed on these units to maintain favorable conditions for the rare and unique species that occur in these important ecological communities.

A water control structure and outlet ditch has also been installed on the Round Lake Unit, which is located in Arden Hills. The sediments of Round Lake include high concentrations of boron and chromium. Because of the potential to disturb these sediments and introduce heavy metal contaminants into the food chain, no active water level management of Round Lake is occurring at this time. In addition, many lakefront homeowners prefer a more open water management regime instead of widespread emergent vegetation. However, the Service should maintain the option of actively managing the water levels in the future upon assurances that periodic drawdowns and reflooding would not cause undue risk to the ecosystem.

Floodplain Forests

No active management techniques, such as cutting for timber stand improvement, are planned for floodplain forested areas other than those that will perpetuate the development of old growth forest. As indicated previously, all former agricultural lands within the floodplain will be converted to forested habitat. Unbroken blocks of forest minimizes the "edge" effect, a fragmented habitat condition that leads to increased predation rates for some nesting birds. Continuous forest also provides for a wildlife movement corridor along the Minnesota River.

Hillside Forests

The mixed deciduous forests that exist along the bluffs of the Minnesota River have an overstory of ash, elm, maple, white oak and basswood with an understory of dogwood, choke berry and other shrubs including European buckthorn, an exotic species. No active management techniques are planned in this plant community other than control measures for exotic species. The community will be allowed to continue to age into an old growth forest. Prescribed fire will be used only in those locations where there is an understory of grassland.

Oak Savanna

The Refuge contains some areas that were historically oak savanna. Nearly 200 acres of historic oak savanna exists on the Louisville Swamp Unit alone. With the cessation of wildfires, the open canopies of the oak savannas were gradually replaced with a closed canopy mixed deciduous forest. Upon removal of all but the bur oaks, and a series of prescribed burns, these oak savannas begin to take on their historic character. Long-term management of these areas includes periodic prescribed burns combined with occasional mechanical removal of unwanted trees and brush.

Bernie Angus

Grasslands

Refuge grasslands are limited primarily to remnant native prairie along the Minnesota River Bluffs and restored native grasses in former agricultural fields. The largest block of remnant native prairie on the Refuge exists along the Eden Prairie Bluffs and is characterized by a diversity of native grasses and forbs. Most of the Refuge's restored native prairie is located on the Rapids Lake Unit (~300 acres) and on Waterfowl Production Areas.

Prescribed fire is the primary tool used to periodically invigorate these native communities and discourage the invasion of introduced cool season grass, noxious weeds, and shrubs. Over the past 10 years, Refuge staff have conducted well over 150 prescribed burns within an urban/wildland interface without a major accident or incident. However, the prescriptions for timing of these burns are very narrow because of safety concerns. Sometimes, delays due to unfavorable weather means that units cannot be burned on schedule. Grassland habitat quality can suffer because of subsequent fuel buildup and woody plant species invasion.

A Fire Management Plan for the Refuge and District was prepared in 2002. These plans are required before conducting either prescribed burning or wildfire suppression. The plan describes in detail fire management objectives, strategies, responsibilities, person-

nel and public safety, monitoring of effects, fire planning, air quality and smoke management, and compliance with Fish and Wildlife Service fire management policies, including Section 7 of the Endangered Species Act. The plan is available at the Refuge Office for public review. In addition to the Fire Management Plan, each prescribed burn must have an individual plan that describes in detail the unit to be burned, objectives, weather parameters, safety, crew size, equipment, contingencies, and smoke management.

Smoke and the risk of fire escaping onto private property is a major concern for the public regarding the Service's use of prescribed fire. As noted, smoke management is a part of each unit burn plan and burns are not conducted if smoke drift will cause a safety hazard to traffic or adjacent private dwellings. Neighbors are notified prior to burns to ensure precautions in the event that some smoke drifts over residences. Burn plans are designed to minimize escape of fires onto private property through the use of fire breaks, and burning within strict weather parameters and fire behavior models. Each plan also describes contingency plans in case of fire escape, including pre-burn notification of local fire departments and other units of government such as MnDNR fire crews.

Exotic Species Control

Several exotic species exist on Refuge lands and have the potential to significantly affect the diversity and quality of important wildlife habitats. Most notable among these are leafy spurge, which has invaded Refuge grasslands, purple loosestrife in a few of the wetlands, and European buckthorn, which is prevalent in the understory of the oak savanna on top of the bluff and in the floodplain forest. Other exotics include Phragmites, Reed's canary grass, and a small amount of spotted knapweed.

An Exotic Species Management Plan was developed in 2000 and serves to document and organize Refuge efforts to control these species. Consistent with this plan, biological control is used wherever possible followed by mechanical removal of the plants. Chemical control of these exotics is only used as a last resort. Due to the widespread distribution of these exotics, the Refuge has chosen to place emphasis on the control of leafy spurge followed by purple loosestrife and European buckthorn.

To date, leafy spurge beetles have been released on the Upgrala Unit in cooperation with the U.S. Department of Agriculture and the Minnesota Department of Agriculture. Beetles have been released on most spurge sites on the Refuge. In addition, purple loosestrife beetles, including several different species, have been released on Refuge sites. Finally, European buckthorn has been removed by cutting on a limited basis.

USFWS File Photograph

Habitat Management on the Wetland Management District

The 14-county Wetland Management District is in the transition zone between the eastern deciduous forest and the tallgrass prairie. Consequently, lands acquired contain a variety of wetland, grassland, and forest habitats. Our primary objective for waterfowl production areas and easements is to restore and manage diverse, productive, and sustainable native plant

communities. As with Refuge lands, these habitats will be periodically managed to maintain their value to waterfowl as well as other wildlife species. It should be noted that several of the waterfowl production areas in the District are former agricultural lands that contained deciduous forests. Where this occurs, these lands are being restored to grassland-wetland complexes and primarily managed for waterfowl production and grassland nesting birds.

Wetlands
A variety of wetlands occur on the Waterfowl Production Areas and easements within the District and provide important habitat for waterfowl, waterbirds, and associated species. Where possible, these wetlands are being restored to their historic levels. Due to challenging logistics associated with these scattered tracts, water control structures are only installed in rare instances.

Grasslands
All former agricultural fields are converted to grassland to provide for good waterfowl and grassland bird nesting cover. A mixture of six species of native grass and 30 species of native forbs are generally used for these sites. Once established, prescribed burns are used to maintain the areas' vigor and value to wildlife.

Oak Savanna
A small amount of oak savanna occurs on a few Waterfowl Production Areas. Most of these areas have been identified and will be restored to historic communities as time and resources permit. As with grasslands, prescribed burns will be used on these areas periodically to maintain their diversity and wildlife values.

Forests
Small stands of eastern deciduous forest occur on some Waterfowl Production Areas that provide some limited habitat for forest birds. No active management is contemplated in the foreseeable future for these forests.

Habitat Management: Private Lands Program

The Partners for Fish and Wildlife Program is very important to Minnesota Valley National Wildlife Refuge and its District since significant wetland, riparian and grassland habitats have been restored throughout the area. The seamless implementation of Refuge, District, and Partners programs also serve to restore and protect an array of wildlife habitat located in uplands as well as in the floodplain. These restorations provide excellent production and migration habitat for area wildlife and serve to strengthen community support for wildlife conservation issues.

Since 1987, more than 10,000 acres of habitat have been restored by Refuge staff through the Partners program. This program has fostered excellent relationships between the Service and many local partners including the MnDNR, the Natural Resource Conservation Service, the Metropolitan Council, soil and water conservation districts, conservation clubs and organizations and, most importantly, private landowners. Refuge private lands biologists serve to "broker" the programs of others with the common goal of restoring and protecting additional wildlife habitats on private lands.

Fish, Wildlife, and Plant Monitoring

The monitoring of fish, wildlife, and their habitats at the Refuge and District is conducted to provide information that is used to make management decisions and support statewide and national conservation efforts. The Resource Inventory Plan, which contains protocols for all monitoring, inventories, surveys and investigations, is the foundation of the biological program for the Refuge and District. Among other items, each protocol describes its purpose, methods, study area, data analysis, and data storage. Within the Plan, the protocols are organized into one of three categories. These categories are Baseline Information, Management Monitoring, and Cooperative Projects. It should be noted that the Resource Inventory Plan is a living document that is constantly subject to change and improvement. Fish, wildlife, and plant monitoring activities currently existing on the Refuge and District are summarized in the following paragraphs.

Bald Eagle Inventory: All Bald Eagle nests on the Refuge are monitored monthly by staff and volunteers to obtain basic habitat and phenology data. All information is shared with the MnDNR Nongame Program, which monitors nesting activity throughout the state.

Colonial Bird Surveys: The Wilkie Unit supports a large Great Blue Heron/Great Egret colony on the west shore of Blue Lake. Winter nest and summer nestling counts are conducted annually to monitor trends in the breeding population and reproductive success of the colony. The number of Double-crested Cormorant, Green Heron, and Black-crowned Night Heron nests are also recorded.

Point Counts for Songbirds: This protocol was developed to document the non-game bird species that are using mature floodplain forest located on the Refuge.

Frog and Toad Calling Survey: Frog/toad calling surveys are conducted annually at specific Refuge units to determine population status and diversity. The survey methods were adopted from the North American Amphibian Monitoring Program. The data collected is shared with Minnesota Frog Watch, which administers the Minnesota frog/toad survey efforts.

Marsh Birds: These species are surveyed using a modified version of the Marsh Monitoring Program developed by Bird Studies Canada. Every 5 years play back is used to detect the presence of Virginia Rails, Sora, Least Bitterns, American Bitterns, Pied-billed Grebes, King Rails, Common Moorhens, and American Coots.

Muskrat and Beaver Lodge Index: Muskrat numbers are monitored annually on select Refuge Unit marshes using winter ground count methods to estimate reproductive success. House counts are conducted and occupancy confirmed, via temperature probes, during winter months when ice thickness permits safe foot travel. Beaver lodges are also noted during the muskrat surveys.

Waterfowl: Waterfowl surveys are conducted monthly (biweekly during migration) on specific wetlands throughout the Refuge. The data are used to provide managers and the public with current information on the distribution and abundance of waterfowl using the Refuge, and to identify annual trends in waterfowl use.

Waterbird Inventory: Waterbird counts are conducted in conjunction with waterfowl surveys and provide information about distribution and relative use of Refuge wetlands.

Invertebrates: Recently, Refuge volunteers began compiling a list of lepidopterans (butterflies) and moths found in the Refuge as well as a voucher collection to be used in the Refuge Visitor Center. Most of the survey data and collecting efforts were conducted on the Louisville, Upgrala, and Rapids Lake units with hopes to expand the effort to other parts of the Refuge.

Vegetative Cover Mapping: Refuge units and District lands have been mapped according to the Minnesota Land Cover Classification System that was recently developed by the MnDNR in cooperation with many others. The classification system is a five-level hierarchial design, permitting a gradation of refinement relevant to any land cover mapping project. This system is valuable in an urban interface because it combines vegetative cover mapping with the mapping of artificial and impervious features.

Floodplain Forest Restoration Effectiveness: This protocol was designed to test a variety of floodplain forest restoration techniques to identify which technique or techniques successfully reduces the cover of reed canary grass. In addition, the survivability of planted trees and the natural regeneration of seedling trees into the restoration area will be investigated. This information will help management focus on a technique that is most effective for restoring floodplain forest.

Louisville Swamp Oak Savanna: A long-term monitoring plan is in place to track changes in the flora and fauna communities before and after management actions are conducted. The purpose is to assist in determining the success of the oak savanna restoration efforts on Louisville Swamp.

Rapids Lake Oak Savanna: A long-term monitoring plan is in place to track the vegetative changes that occur in response to oak savanna restoration efforts on the Rapids Lake Unit.

Purple Loosestrife: The Refuge has developed a monitoring protocol to evaluate the success of *Galerucella* beetles released on wetlands within areas of high purple loosestrife infestations. This monitoring will continue as additional beetles are released wherever this exotic plant occurs.

Native Prairie Fire Management: This monitoring protocol is used to assess the effectiveness of fire management on select samples of original native prairie. The method was initially used to collect baseline and postburn information on the Upgrala Bluff, but the same method can be used to monitor changes at other prairie sites.

Restored Prairie Fire Management: This protocol is currently being developed and it will monitor the effects of prescribed burning on a select sample of restored prairie habitat.

Leafy Spurge Biological Control: This protocol was developed to monitor the effects of releasing beetles as biological agents for the control of leafy spurge.

Water Quality: In fiscal year 2002, we decided to initiate a new wetland health protocol that is known as the Wetland Health Evaluation Project. This protocol uses invertebrate and vegetative indices developed by staff at the Minnesota Pollution Control Agency to

help determine the health of wetlands. This method and basic water quality monitoring will focus on obtaining baseline information and long-term water quality trends of wetlands throughout the Refuge.

White-tailed Deer Surveys: In an effort to determine the distribution and density of whitetail deer in the Twin Cities area, the MnDNR conducts an annual winter deer survey; a portion of this survey is conducted on Refuge lands. This information is used to estimate Refuge deer populations and to determine the effectiveness of deer control efforts.

Gypsy Moth Trapping: In cooperation with the U.S. Department of Agriculture, gypsy moth traps at several locations on the Refuge are used to determine the occurrence of this species. No gypsy moths have been discovered on Refuge lands since this cooperative program was initiated in 1991.

Mid-Winter Waterfowl Survey: In cooperation with the MnDNR, Refuge staff conduct a mid-winter waterfowl survey to assist in determining waterfowl distribution and habitat utilization throughout the nation. A total of 63 sites located throughout the Twin Cities area are surveyed in January of each year.

Predator and Furbearer Scent Post Surveys: This survey is conducted annually to determine the relative distribution and abundance of these species on Refuge lands. In addition, this information is provided to the MnDNR for incorporation into that agency's statewide database.

Refuge Public Recreation, Environmental Education and Outreach

The second component of the Refuge's mission identifies the need to develop quality wildlife-dependent recreation and interpretive programs for Twin Cities residents. Consequently, a variety of hiking trails, interpretive trails, and related facilities have been developed over the years. Most of the river units of the Refuge are connected to the Minnesota Valley State Trail, which is authorized to be constructed from Fort Snelling upstream to LeSueur. At the time of this writing, there is a movement among conservation organizations and trail users to extend the Minnesota Valley State Trail along the full length of the Minnesota River. This proposal will likely be considered by the Minnesota State Legislature in the near future.

The visitor center, which is located in Bloomington, is a main attraction of the Refuge and serves as a welcoming and orientation site for Refuge visitors. The 32,000-square-foot facility was opened to the public in September 1990 and contains nearly 8,000 square feet of exhibit space, a 120-seat auditorium, two multi-purpose educational classrooms, a resource library, a hearth room, a bookstore, administrative offices, a service garage and storage space. An observation deck is located opposite the main entry of the building. Parking is provided for 125 cars and buses.

An art gallery is also administered within the Visitor Center for local artists to display their natural resource related works. On an annual basis, approximately 10 artists are provided this opportunity.

In addition to environmental education and interpretive programming, the Visitor Center and its equipment are used to a limited degree by non-profit organizations for their